Pythagoras And The PythagoreanTheorem

WebQuest Description: In this Webquest the main aim is to understand; who was Pythagoras and what has he done for us, what is the Pythagorean Theorem, what can it be used for and its applications in real life.

This lesson is designed for Form 3 Scheme A Mathematics students. This lesson will take 90 minutes (one double lesson).
Grade Level: 9-12
Curriculum: Math
Keywords: Pythagoras, Pythagorean Theorem, Right Angled Triangle, Hypothenuse
Published On: 2011-01-03 14:14:40
Last Modified: 2010-12-16 06:02:15
WebQuest URL: http://zunal.com/webquest.php?w=81761

Introduction

Situation...
Fiona is locked in the house and is calling Shrek to save her.
It is difficult for Shrek to save her as the only open window is on the second floor, 9 metres above the ground.
In order to save Fiona, Shrek has to borrow a ladder from one of his neighbours. As outlined in the picture attached below, there is a bush along the edge of the house.
Shrek has to place the ladder 3metres from the house.
Help Shrek to save Fiona by calculating the length of the ladder he needs to reach the window and complete his mission.

Revision of important mathematical concepts needed for the coming lesson

Before we proceed on with this lesson it is best to challenge your knowledge by going through the Powerpoint Presentation below and become familiar with important mathematical concepts that are needed for this lesson...Let's take a look!!
After viewing Powerpoint Presentation, a class discussion about these mathematical concepts will follow together with teacher.

Tasks

The Triangle Activity
The main purpose behind this activity is to help you discover the relationship between the length and breadth of a right angled triangle with its diagonal
You are given a set of 4 different sized triangles.
Follow the worksheet attached below. Your task is to measure the three sides of each triangle and fill in Table 1 found in the attached worksheet.
Then square all sides of each triangle and fill in Table 2.
After these steps it is important to challenge yourself by answering these questions which can help you arrive to the equation of Pythagoras Theorem.

Questions on this Task

What is the special name of the triangles used in the activity?

What can you notice about side c of each triangle?

What is the relationship between the sides of a right angled triangle? (Consider Table 2)

Discussion on the activity:
From this activity one can conclude that:
a2+b2 = c2
where a is called the adjacent, b is called the opposite and c is called the hypotenuse.
This relationship between the sides of a Right Angled Traingle is called The Pythagoras Theorem.

Attached you can find a PPP containing all the information outlined from this activty together with a better explanation of the theorem.

Who was Pythagoras?

The theorem was named after Pythagoras who was the master mind behind this relationship.

Attached you can find a slide containing information about Pythagoras and a Pythaogras Song.

Process

Proof of Pythagoras Theorem
It is important to know that Pythagoras did not come up with this Thoerem without giving us reasons from where this theorem emerged. One can find different proofs of this theorem.

Attached you can find a Powerpoint Presentation consisting of a detailed explanation of the proof.
For a better understanding of the proof work out the Handout attached below which builds on the PPP outlined above.

To further your understandings on the Proof of Pythagoras Theorem attached there is a video explaining the theorem by using liquids.

Applications of Pythagoras Theorem

Now apply what you have learned from this lesson by working the Worksheet attached below which contains real life situations that need to be solved by using the Pythagoras Theorem.

Evaluation

Students will be assessed on 'The Triangle Activity' which will carry 50% of the total marks and on the Worksheet on the applications of Pythagoras Theorem which will also carry another 50%of the total marks.

Category and Score	Unable to complete a task	Able to complete at least 50% of the task	Able to complete 75% of the task	Able to complete the whole task	Score
The Triangle Activity	Unable to complete 'The Triangle Activity'	Able to complete only Table 1 of the 'The Traingle Activity'	Able to complete both Tables of 'The Triangle Activity'	Able to complete both tables of 'The Triangle Activity' and come up with the theory	50%
Worksheet on the applications of Pythagoras Theorem	Unable to work any problems on the worksheet	Able to work only 2 questions from the Worksheet	Able to work only 3 questions from the Worksheet	Able to work all the questions of the Worksheet	50%
				Total Score	100%

Conclusion

Applications of Pythagoras Theorem in Real Life

Pythagoras Theorem can be used in real life to:

Calculate heights of buildings etc...

Find distances

Discussion with the teacher on real life applications of the Pythagoras Theorem

Remember:
Pythagoras Theorem is only used with Right Angled Triangles
The sum of the squares of the sides of a right angled triangle is equal to the square of the length of the hypotenuse
a2+b2 = c2

Situation....
Now using the knowledge you have learnt on Pythagoras Theorem, you are able to help Shrek in saving Fiona.
Go back to the Introduction Section of this Webquest and work out the question given by applying the Pythagoras Theorem.
Your answer will help Shrek to find the length of ladder needed to help save Fiona.

 Make sure you do your best in helping Shrek.
Fiona's life lies on your responsibilty!!

 Extension
Attached you can find a quiz and a game on Pythagoras Theorem. Try them out!

Teacher Page

This lesson is targeted for Form 3 Scheme A students
NoteAttached you can find the lesson plan associated with this topic in order for this webquest to be conducted in a normal classroom environment.
PrerequisitesBasic Knowledge of Trigonometry.Basic knowledge of a right angled triangleGood knowledge on Area: how to find the area of a square and of a right triangleLabeling of sides of a right triangle (opposite, adjactent and hypothenuse)Good use of calculator.

                                                                                                       Using subject of the formula. Rounding up to significant figures and decimal places

 You will also find attached as a Powerpoint Presentation:the solutions to the worksheet on the applications of Pythagoras Theorem found in the evaluation sectionthe solution to the Challenging Situation given in the introduction of this webquest

Standards

Credits

Other